

ASSOCIATION OF RESIDENTIAL UVR EXPOSURE WITH CHILDHOOD BLOOD PRESSURE AND CAROTID INTIMA-MEDIA THICKNESS

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Background and Aims: Emerging data suggest that serum vitamin D level is inversely associated with carotid intima-media thickness (CIMT) and blood pressure. Because sun exposure (Ultra violet radiation, UVR) is a major determinant of serum vitamin D level, we hypothesized that residential UVR level is also associated with CIMT and blood pressure.

Methods: We investigated our hypotheses in 738 children (mean age=11.3 years, standard deviation (SD) = 0.63) of the Children's Health study on whom we measured CIMT, systolic (SBP) and diastolic (DBP) blood pressure. UVR estimates were obtained from an ANUSPLIN model for the year of study participation based on the latitude and longitude of participant residences. We derived one-square-kilometer ground surface level UVR values using spatial smoothing techniques for data from UVR measurement stations throughout the United States, adjusted for local climate and terrain features. All association analysis utilized multivariate linear regression models with adjustment for age, sex, race, family income, and town of residence. Models for UVR and CIMT were additionally adjusted for blood pressure.

Results: The residential UVR level ranged from 4980 to 5361 Watt-hour (WH)/m² with a SD of 81 WH/m². The mean (SD) of CIMT, SBP and DBP in these children were 56.6 µm(4.4), 104 mm Hg(8.5) and 57 mm Hg (6.2), respectively. Residential UVR level was an independent determinant of CIMT and diastolic blood pressure. Each 162 WH/m² (2 SD) increase of UVR exposure was associated with 3.6 (95% confidence interval (CI) 0.04, 7.23) µm decrease in CIMT and 5 (95%CI 0.04, 9.7) mm Hg decrease in diastolic blood pressure. No significant association was observed between UVR level and SBP.

Conclusion: Residential UVR level is inversely associated with CIMT and DBP in children which might be important for their cardiovascular health.